REMARKS

Paragraph 2 of the Office Action, the Ueki Reference

In paragraph 2 of the Office Action the Examiner rejected claims 27-28 and 30 under 35 U.S.C. §102(b) or §103(a) based upon Ueki et al. Japan Patent 02302556 A.

The Examiner has attempted to read the structure of claim 27 on the Ueki reference. With respect, the following explanation of Ueki will show that Ueki does not function in the manner described by the Examiner, and particularly, the valve 21 and the piping on either side of it does not function as a recirculation conduit to recirculate a portion of the water passing through the heat exchanger while there is a primary flow of water from the water supply conduit through the heat exchanger into the water discharge conduit.

Claim 27 has been further amended to clarify the function of the recirculation conduit in relation to the flow of water through the water supply conduit and water discharge conduit.

Applicant is attaching hereto a marked up copy of the Ueki reference which has been identified as Exhibit A and consists of six pages. The first two pages are a copy of the English language abstract from Ueki and the description of Ueki in that abstract has been broken into four parts which sequentially describe what has been identified in Exhibit A as modes #1, 2, 3 and 4.

Pages 3-6 of Exhibit A are enlarged photocopies of Fig. 1 of Ueki which have been marked up and highlighted to illustrate the arrangement of the various valves

in Ueki and the flow path which is in operation. Also noted is the operational position (either on or off) of the burner 6.

Ueki is directed to a system which is primarily concerned with storage and maintenance of low temperature hot water when the burner is turned off and water is not flowing from the water supply conduit 1 to the water discharge conduit 18. As shown and described at page 3 of Exhibit A, in this mode #1 there is no flow of water in through the water supply conduit 1 or out of the water discharge conduit 18. In fact, the burner 6 is turned off and the water is not being heated. In mode #1, the pump 20 is simply circulating water in a loop presumably to recover some heat from the heat exchanger as the burner cools off.

In mode #2 illustrated at page 4 of Exhibit A, the burner 6 is still off, and the position of valves 17 and 21 have been changed so that low temperature hot water which was sitting in the discharge conduit 18 is pumped back into a low temperature hot water storage tank 22. The burner 6 is still off and the water is not being heated. There is no primary flow of water through the water supply conduit 1 to the water discharge conduit 18.

In mode #3 as illustrated at page 5 of the Exhibit A, there still is no primary flow of water in through the water supply conduit 1 or out of the water discharge conduit 18. In mode #3 the burner 6 has been turned on and low temperature hot water from the storage tank 22 is simply being circulated in the highlighted loop as the burner 6 and heat exchanger 5 warm up and as the water warms up.

In mode #4 as illustrated at page 6 of Exhibit A, when the water has reached the desired temperature and the burner 6 is operating at the desired level, the

pump 20 is turned off, the valve 21 is closed, and now finally the valve 13 is opened and a primary flow of water flows into the water supply conduit 1, then through the heat exchanger 5 where it is heated, then out through the water discharge conduit 18 to a "hot water feeding plug 19". It is only in this mode #4 where there is any primary flow of water into the water supply conduit 1 and out the water discharge conduit 18. But in this mode #4, the valve 21 is closed and there is never any recirculation of any portion of the heated water back to the inlet of the heat exchanger while hot water is being supplied out the discharge conduit 18. Thus the valve 21 and the conduit in which it is disposed never function as a recirculation conduit and recirculation valve at any point in time when there is actually a primary flow of water through the heat exchanger being heated and flowing out the discharge conduit 18.

Claim 27 as amended requires that there be:

> "a recirculation conduit communicating the water outlet with the water inlet and bypassing the heat exchanger for directing recirculated water from the water outlet to the water inlet, while the water supply conduit and water discharge conduit are open and water is flowing in through said water supply conduit and out through said water discharge conduit, so that the recirculated water recirculates through the heat exchanger without having passed through any portion of the water discharge conduit downstream of the recirculation conduit"

No such element is shown or suggested by the Ueki reference.

Furthermore, as the Examiner has conceded and attempted to address with the "obvious matter of design choice" rejection, claim 27 goes on to require:

> "a controller, operably associated with the temperature sensor and the recirculation valve, for varying a position of the recirculation valve in response to the water temperature sensor, wherein the controller maintains the water temperature at the water inlet to the inner flow path of the heat exchanger at or above a selected temperature sufficient to prevent condensation of combustion products from the burner on the exterior surface of the heat exchanger."

This description of the controller, taken in conjunction with the required structure and function of the recirculation conduit and recirculation valve, explains the purpose of the recirculation conduit and the recirculation valve.

As the Examiner has acknowledged, Ueki in no way shows or suggests a controller having the required functionality of maintaining the water temperature as described to prevent condensation of combustion products on the exterior surface of the heat exchanger.

The Examiner has first suggested that "the controller 12 of Ueki et al. is capable of maintaining the water temperature at the water inlet to the inner flow path of the heat exchanger at or above a selected temperature sufficient to prevent combustion of combustion products from the burner on the exterior surface of the heat exchanger." With respect, that is false. As has been shown by the above explanation, Ueki cannot do this when there is a primary flow of water through the heat exchanger being heated, because the pump 20 is turned off and the valve 21 is closed so that there is no possibility of any recirculating flow in Ueki.

Second, the Examiner has suggested that "it would have been an obvious matter of design choice to select the water temperature at any desired temperature". Again there is absolutely no support for that, and the Examiner's

suggestion that "applicant has not disclosed that the claimed temperature solves any stated problem in a new or unexpected way or is for any particular purpose which is unobvious to one of ordinary skill in the art" is astounding.

The claim does not simply require that the inlet temperature be maintained at a specific temperature. Applicants have identified a definite problem, namely formation of condensation on the exterior of the heat exchanger. Applicants have identified a new way of solving that problem which is not shown or suggested by any of the cited references, namely the recirculation of a portion of the heated water back to the inlet of the heat exchanger so that a portion of the heat energy from the heat exchanger is used to maintain the inlet temperature of water coming into the heat exchanger and thus maintain the temperature on the exterior of the heat exchanger high enough that combustion products cannot condense on it. This is clearly a new approach, given the fact that the Examiner cannot find any reference showing or suggesting the use of this technique to prevent condensation.

Accordingly, for all the reasons set forth above claim 27 as amended is submitted to be allowable over Ueki.

Paragraph 6 of the Office Action

In paragraph 6 of the Office Action the Examiner has similarly rejected claims 27-28 and 30 under 35 U.S.C. §102(b) or §103(a) based upon Kato Japan Patent 60263048 A.

Again, the Examiner has attempted to read the disclosure of Kato on claim 27. But, in doing so, the Examiner has again misconstrued the manner of operation

of Kato and overlooks the fact that Kato does not in any way provide a recirculation function, and does not have a recirculation valve as required by claim 27.

The primary flow in Kato is into the water supply conduit 5, through a circulating pump 12 and a solenoid valve 36 then through the interior piping to a heat exchanger 1 and then out the discharge conduit 16.

The place the Examiner's analysis fails is on identification of a recirculation conduit and recirculation valve. First, the Examiner says the recirculation conduit constitutes the conduits 10 and 14. The conduit 10, however, is the primary flow conduit and is merely an extension of water supply conduit 5. There is certainly no recirculation that takes place in conduit 10. Conduit 14 could perhaps function as a recirculation conduit, but as is further shown below it does not. Conduit 14 simply provides an alternative flow path for the heated water to a reservoir or storage tank 4.

Exhibit B submitted herewith is a marked up copy of the English language abstract of Kato, plus two marked up copies of Fig. 3 of Kato illustrating and describing its modes of operation which have been identified as mode #1 and mode #2.

In mode #1 illustrated at page 3 of Exhibit B, the unit is started up and cold water initially flows into water supply line 5 and 10 where it is pumped by pump 12 through valve 36 and through the heat exchanger 2 and then directly to the water discharge conduit 16 which provides the newly heated water to a point of use. At the same time, some of the heated water from heater exchanger 2 is flowing through

line 14 into the storage tank 4 to fill the storage tank 4. This continues until the storage tank 4 is filled with hot water.

Then, as shown at page 4 of Exhibit B, the system switches into mode #2. Valve 36 closes, pump 12 is turned off, and the heater 3 is turned off. There is no flow of water through the heat exchanger 2. Hot water is supplied solely from the storage tank 4 and flows back through lines 14 and 16 to the point of usage.

When the water temperature in the tank 4 drops below a required level, the system returns to mode #1.

It is not clear from the description provided of the Kato reference whether during mode #1 there is flow out of the storage tank 4 and into the water supply conduit 5, 10. It appears from the drawing that is possible, in which case the Examiner might contend that the flow path from point A identified at page 3 of Exhibit B, through line 14 and down through storage tank 4 to point B identified at page 3 of Exhibit B would be a "recirculation conduit". But, if that is the case, there is no recirculation valve as required by claim 27 in the recirculation conduit. The valve 36 which the Examiner has identified as being a recirculation valve, clearly is not in any flow path which can be described as a recirculation path, and it certainly does not function as a recirculation valve as required by the language of claim 27.

The Examiner has attempted to cure this omission by artificially defining the recirculation path as including the conduit 10. That, however, is not a proper interpretation. The supply conduit 5 is required by claim 27 to be connected to the water inlet. The inlet is the point 2a shown in Fig. 3 of Kato. Thus the supply conduit consists of both the conduit portion labeled 5 and the conduit portion

labeled 10. Furthermore, the valve 36 clearly does not function as a recirculation valve.

Thus, the first element of claim 27 missing from the Kato reference is "a recirculation valve disposed in the recirculation conduit".

Additionally, Kato is missing the element of:

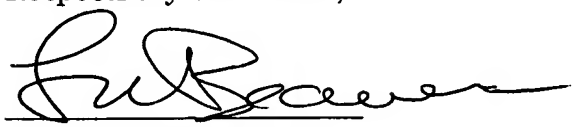
> "a controller, operably associated with the temperature sensor and the recirculation valve, for varying a position of the recirculation valve in response to the water temperature sensor, wherein the controller maintains the water temperature at the water inlet to the inner flow path of the heat exchanger at or above a selected temperature sufficient to prevent condensation of combustion products from the burner on the exterior surface of the heat exchanger."

The comments made above with regard to the controller not being taught by the Ueki patent are equally applicable to the Kato patent.

Accordingly, it is respectfully submitted that the invention of independent claim 27 is neither shown nor suggested by either the Ueki or the Kato reference which have been relied upon by the Examiner, and that claim 27, and all claims dependent therefrom, are allowable for the reasons stated.

It is noted that in paragraphs 3, 4, 5, 7, 8 and 9 of the Office Action the Examiner has cited several secondary references with regard to features found in the dependent claims. But, since none of those secondary references teach the elements of claim 27 which are missing in the primary references Ueki or Kato, claim 27 and all the claims dependent therefrom should be allowed.

Respectfully submitted,



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CERTIFICATE OF FIRST CLASS MAILING

I hereby certify that this Response to Fourth Office Action, with Exhibits A and B, in U.S. Patent Serial No. 10/624,374 filed July 22, 2003 is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

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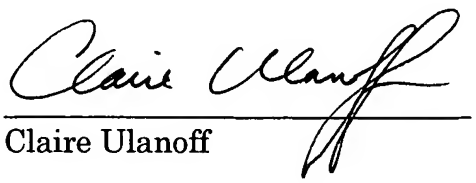

Claire Ulanoff

PAT-NO: JP402302556A

DOCUMENT-IDENTIFIER: JP 02302556 A

TITLE: HOT WATER FEEDER

PUBN-DATE: December 14, 1990

INVENTOR-INFORMATION:
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MURAKAMI, HIROKUNI

ASSIGNEE-INFORMATION:
NAME COUNTRY
MATSUSHITA ELECTRIC IND CO LTD N/A

APPL-NO: JP01122124

APPL-DATE: May 16, 1989

INT-CL (IPC): F24H001/14

US-CL-CURRENT: 237/59

ABSTRACT:

PURPOSE: To enable hot water of desired temperature to be always used by a method wherein as a hot water feeding termination instruction is outputted, hot water of low temperature within a piping is stored in a hot water storing means and as the hot water is to be fed, the hot water is circulated within a heat exchanger, the hot water is heated and further as the hot water shows a predetermined temperature, the hot water is fed.

CONSTITUTION: An operation setting means 23 is operated to output a hot water feeding termination signal, resulting in that a heating source driving means 59 is stopped and then a combustion is terminated. A first electromagnetic valve 13 is turned off and a second electromagnetic valve 16 is turned on. A first changing-over valve 17 is changed over at its OFF position and a second changing-over valve 21 is changed over toward a direction DE so as to turn on a pump 20. Hot water within a heat exchanger 5 is circulated, a reduction in value less than a set value is detected by a hot water temperature sensing means 15. As a time elapses by a set value of a timer value setting

Mode #1

Ex. A, p. 1 of 6

means 29, the changing-over valve 17 is changed over toward a direction AB and the changing-over valve 21 is changed over toward a direction DF, the pump 20 is turned on and the hot water of low temperature within a hot water feeding pipe 18 is stored in a hot water storing means 22./As a hot water feeding start signal is inputted to a control part 12, the electromagnetic valve 16 is turned on, the changing-over valve 17 is opened toward a direction AC, the changing-over valve 21 is opened toward a direction DE, the pump 20 is turned on, the water is heated by a burner 6./As the water shows a predetermined temperature, the electromagnetic valve 13 is opened and the changing-over valve 17 is changed-over toward the direction AB, the hot water is supplied to a hot water feeding plug 19, the changing-over valve 21 is turned off and then the pump 20 is stopped.

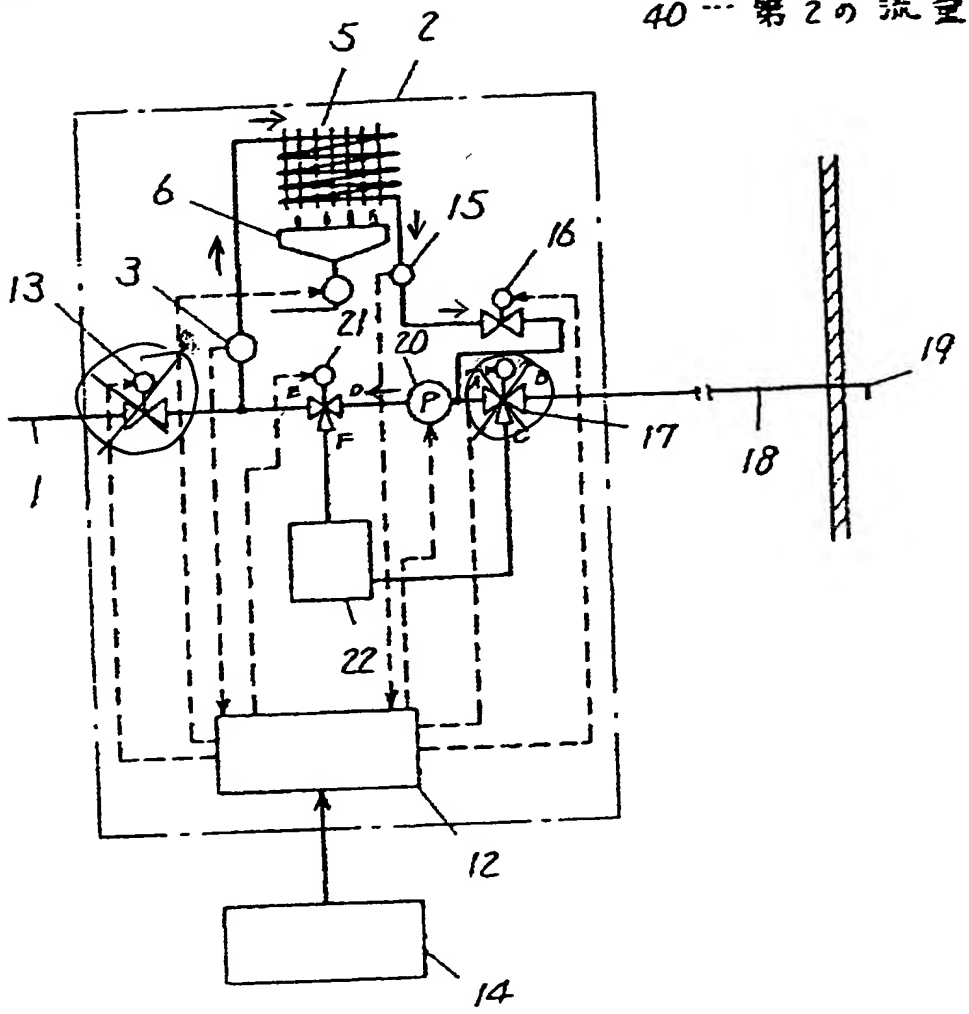
Mode # 2

Mode # 3

Mode # 4

12 --- 制御部
13 --- 第1の電磁弁
16 --- 第2の電磁弁
17 --- 第1の切換弁
19 --- 給湯カラン
20 --- ポンプ
21 --- 第2の切換弁
22 --- 貯湯手段
40 --- 第2の流量検出手段

第 1 図



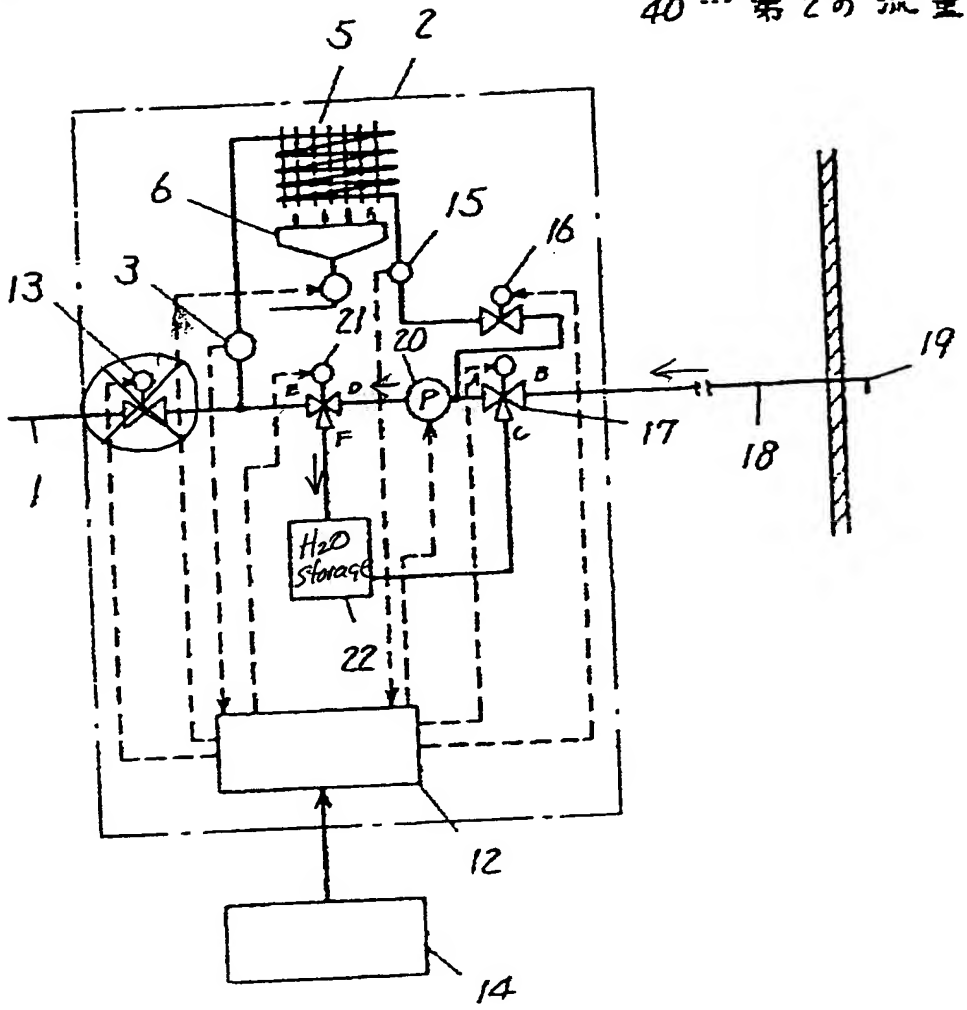
Mode #1

Burner 6 is off.
Valves 13 and 17 are closed.
Valves 16 and 21 are open.

Pump P circulates water in the highlighted loop as indicated by arrows, but water is not being heated and water is not being supplied to outlet.

12 --- 制御部
13 --- 第1の電磁弁
16 --- 第2の電磁弁
17 --- 第1の切換弁
19 --- 給湯カラン
20 --- ポンプ
21 --- 第2の切換弁
22 --- 貯湯手段
40 --- 第2の流量検出手段

第 1 図



Mode #2

Burner 6 is still off.

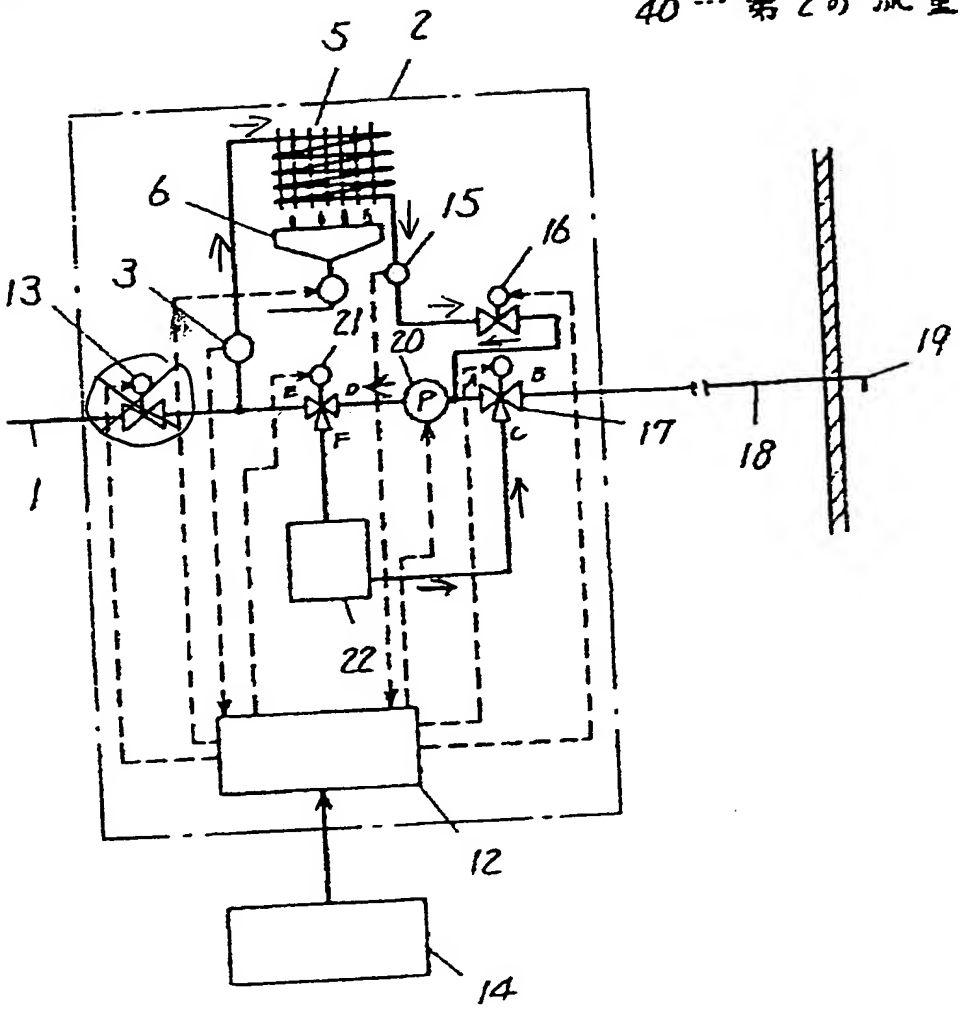
Valve 13 is still closed.

Valve 17 is moved to position AB, and valve 21 is moved to position DF.

Pump P is turned on and "hot water of low temperature within a hot water feeding pipe 18 is stored in a hot water storing means 22". The direction of flow is along the highlighted path in the direction of the arrows.

12 --- 制御部
13 --- 第1の電磁弁
16 --- 第2の電磁弁
17 --- 第1の切換弁
19 --- 給湯カラン
20 --- ポンプ
21 --- 第2の切換弁
22 --- 貯湯手段
40 --- 第2の流量検出手段

第 1 図

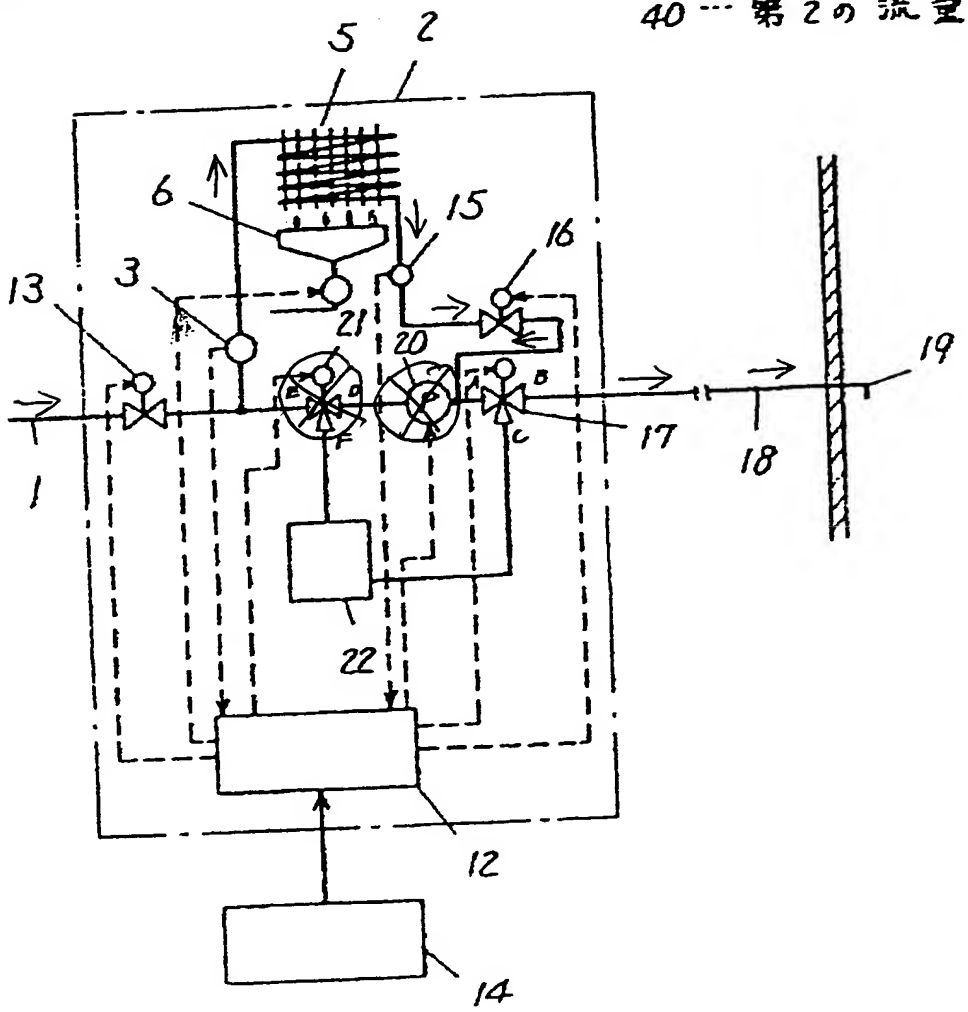


Mode #3

Valve 13 is still closed.
Burner 6 is turned on.
Valve 16 is opened.
Valve 17 is moved to position AC.
Valve 21 is moved to position DE.
Pump P(20) pumps water from storage through the highlighted loop in the direction of the arrows and the water begins heating up.

12 --- 制御部
13 --- 第1の電磁弁
16 --- 第2の電磁弁
17 --- 第1の切換弁
19 --- 給湯カラン
20 --- ポンプ
21 --- 第2の切換弁
22 --- 貯湯手段
40 --- 第2の流量検出手段

第 1 図



Mode #4

When water is at desired temperature, inlet valve 13 opens, valve 17 moves to position AB, valve 21 closes, and pump P(20) stops.

Water flows from inlet line 1, through heat exchanger 5, through outlet line 18 to "hot water feeding plug" 19.

PAT-NO: JP360263048A

DOCUMENT-IDENTIFIER: JP 60263048 A

TITLE: HOT-WATER SUPPLIER

PUBN-DATE: December 26, 1985

INVENTOR-INFORMATION:
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KATO, SHOZO

ASSIGNEE-INFORMATION:

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APPL-NO: JP59118622

APPL-DATE: June 8, 1984

INT-CL (IPC): F24H001/18, F24H009/20

ABSTRACT:

PURPOSE: To stabilize the temperature of supplying hot-water without effecting complicated combustion control by a method wherein supply of hot-water is effected from a tap-controlled water heater when hot-water is not being reserved in a hot-water reserving tank and excessive heat amount is retrieved to the hot-water reserving tank.

CONSTITUTION: A solenoid valve 36 is opened and a burner 3 as well as a circulating pump 12 are operated until a water temperature, detected by a temperature sensor 9, has become higher than a given temperature and the hot-water is supplied to utilizing units from the tap- controlled water heater 1. The water temperature at the outlet port 2b of a heat exchanger 2 is detected by the temperature sensor 11 to control the flow amount of the circulating pump 12 and maintain the temperature of supplying hot water in the vicinity of a set temperature while excessive hot-water is reserved into the reserving tank 4 through a pipeline 14. When the reservation of hot-water in the reserving tank 4 is finished and the temperature sensor 9 has detected a water temperature higher than the given temperature, the solenoid valve 36 is closed and the burner 3 as well as the circulating pump 12 are stopped. Then,

mode #1

mode #2

Ex. B, p. 1 of 4

the hot-water is supplied to the utilizing units from the reserving tank 4. When the amount of hot-water in the reserving tank 4 is reduced and the temperature detector 37 has detected the water temperature lower than the given temperature, the supply of hot-water is returned to the same effected by the tap-controlled water heater 1.

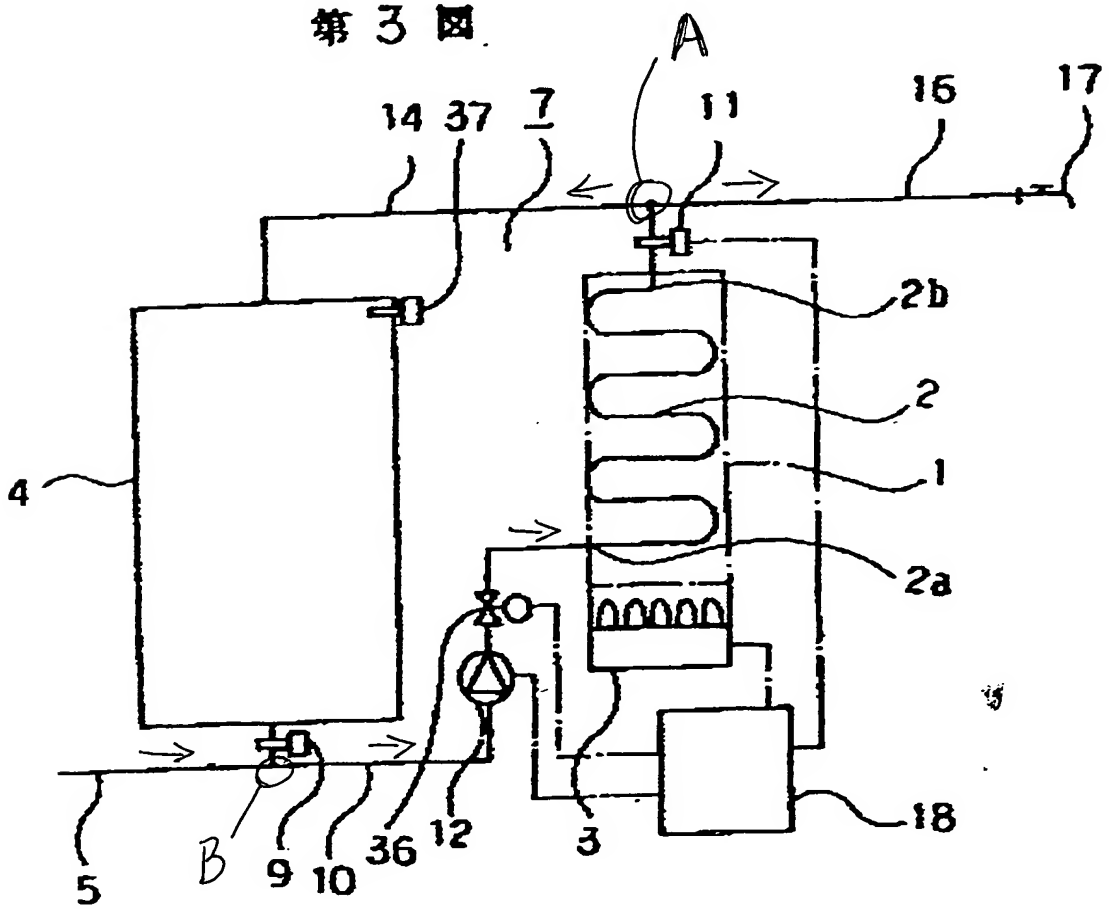
Returns to Mode #1

Mode #1

During warm up, hot water is supplied directly from heat exchanger 2 to discharge conduit 16. Fresh water is flowing into supply conduit 5, 10 and is flowing through heat exchanger 2 where it is heated.

Some of the hot water from heatexchanger 2 is flowing into storage tank 4 to fill it.

第 3 図



Mode #2

When tank 4 is full of hot water, valve 36 closes, and the pump 12 and heater 3 are both turned off. There is ~~no flow~~ through the heat exchanger.

Hot water is supplied solely from the storage tank 4.

第3図